

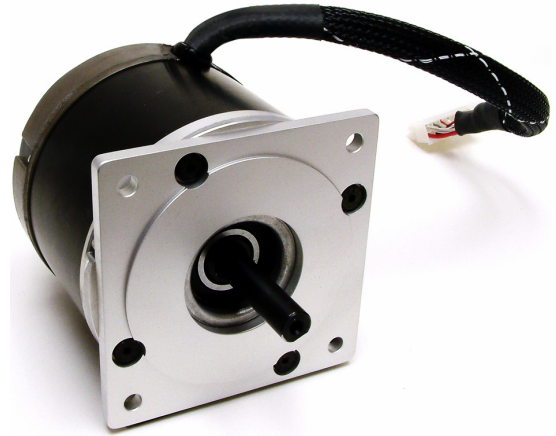


M-3437 ServoMotor

Brushless, Permanent Magnet, Rotary Motor

The M-3437 is an instrument grade, brushless servomotor that is value engineered to provide high performance and low cost in light to medium duty OEM applications.

Because most applications do not involve harsh environmental conditions, Teknic has removed the costly features that are beneficial in harsh environments but unnecessarily add to the motor's cost for all other uses. In clean to moderately dirty environments (semiconductor, medical, packaging, etc.), the M-3437 is robust and exceptionally reliable. For example, the M-3437 servomotor has class H winding insulation (rated to 155°C); the motor has oversized, single-row, deep groove radial bearings held to 15 millionths of an inch tolerance; the magnets are rare-earth; the encoder is shatterproof; and the entire motor line has been carefully refined to provide outstanding field reliability.



PERFORMANCE FEATURES

- Neodymium-Iron-Boron magnets provide high power-density and fade-free performance.
- Direct winding on electrostatically powder-coated stators gives high thermal conductivity for better RMS ratings.
- Windings are rated to 155°C, improving thermal range.
- Low electrical time constant increases responsiveness.
- High power to rotor inertia ratio for rapid acceleration.
- Unique encoder mounting reduces cyclical run-out.
- Low-distortion, sinusoidal back-EMF improves motor smoothness and lowers audible noise.
- Precision, maintenance-free oversized bearings reduce viscous friction and motor noise while smoothing motion and improving motor side-loading capability.
- Precision-machined motor shafts optimize radial and axial load capability.
- Low detent torque provides smooth motion.

PERFORMANCE SPECIFICATIONS

There is no standardized way to specify a motor, so a comparative analysis is difficult. Teknic specs are conservative and real-world. There are no surprises.

- The torque/speed curves show true motor shaft output, not theoretical motor output.
- The continuous ratings are with the motor in free air, not mounted to a sizable heat sink.
- Wattage ratings are based on useable motor *output* power, not *input* power.
- Peak output can be sustained for three seconds and the continuous torque limit is a generous percentage of peak torque. So peak torque is useable in high duty cycle axes.
- The torque constant and back EMF constant (K_t and K_e) are conservatively stated to require the amp to source the stated rating at *peak* sine output, not RMS sine output. This lowers amplifier demand by 40%.

LOW COST OF OWNERSHIP

Although the price of the M-3437 is attractive, price is not the only factor that determines motor cost. M-series motors are engineered to be inexpensive to own.

Terminated Leads Eliminates Harnessing

The M-series motors come harnessed with complete pigtailed to avoid the cost, time and reliability factors associated with assembling flying leads. M-3437 pigtailed utilize automotive-style four-point gas-tight contacts to deliver excellent reliability. In addition to eliminating harnessing handwork and improving motor reliability, this connector style was selected to allow the use of low cost, robust motor cables that can be built and functionally tested in an automated environment. Moreover, the motor connectors provide snap-in, self-locking assembly ease.

Motor Testing

To ensure out-of-the box reliability, every Teknic motor is thoroughly tested before shipment. The tests include:

- Mechanical compliance test.
- Encoder integrity test.
- Hall angle accuracy test.
- Full electrical compliance test.
- Full, extended functional test on a vector torque fixture.

Delivery

The M-3437 servomotor is manufactured in high volume in the USA using standardized methods. The standardized methods provide repeatable build quality, dependable motor performance and reliable lead-time. These standardized methods also include tight controls over the source of materials and other issues that affect long-term availability. Teknic works exclusively with OEM machine designers, so we understand the value of ensured availability over the entire life of a machine.

RELIABILITY AND COST IN CONCERT

There is an art to achieving both low cost *and* high reliability in a product.

In the case of M-series motors, low cost has been achieved because of focus on the specific needs of OEMs in the light industrial automation market. Teknic has engineered the unnecessary and expensive features out of the M-series motors, eliminating a source of costly waste.

Reliability is achieved through evolutionary enhancements accumulated over many years of in-field experience.

So for light- to medium-duty applications requiring reliability, performance, and low cost, Teknic's M-series servomotors are an excellent solution.

The refinements that apply to all M-series servomotors include...

PINNED STATOR DESIGN

The stators are glued and mechanically locked to prevent slippage regardless of use conditions.

DIRECT-MOUNT ENCODER

The encoder disk is shatterproof and the read head has a multiple-aperture grating for reliable operation even when dusty or dirty. The read head is fully encapsulated for increased reliability and ruggedness.

BEARING CAPTIVATION

The high-precision bearings are mechanically captivated and chemically bonded to maintain proper preload and alignment under all rated load conditions.

FEA DESIGNED SHAFTS

Finite element analysis was utilized to reduce stress concentration on machined areas of the shaft. This allows the use of oversized bearings without sacrificing shaft strength.

SPECIFICATIONS

GENERAL	Type:	Brushless; rotary; rare-earth permanent magnet.
	Maintenance:	None.
	Dimensions, in (mm):	D=3.5 (90); L=3.7 (94) – exact length depends on flange selections.
	Weight, oz (g):	50 (1378) – exact weight depends on options selected.
ENVIRONMENTAL	Temperature:	0-60°C (ambient temps > 40°C lowers RMS).
	Humidity:	0-95%, non-condensing.
	Operating conditions:	Up to moderate dust/moisture environments (medical, semiconductor, print, light CNC, are typical).
INPUT POWER	Input voltage:	20-90 VDC.
	Input current:	7.5 A RMS (in free air), 30A Peak.
OUTPUT POWER	Torque with SSt-1500 servo drive:	400 oz-in peak. 135 oz-in continuous ¹
	Wattage with SSt-1500 servo drive:	600 watts Peak (@ 75VDC). 238 watts RMS.
ENCODER	Encoder type:	Direct mount, impact resistant, HP Mylar disk and read head.
	Counts/rev options:	2000, 4000, 8000, 2048, 4092, 8196 (most with or w/o index channel).
HALL EFFECTS	Type:	Angle-adjustable board, 120° spacing. (Only used for initialization with SSt drives).
PHYSICAL MOUNTING	Motor mount options:	NEMA 34 flange or round pilot with thread into motor body mount (shortens motor).
	Shaft mount size:	3/8" (per NEMA 34 spec).
WIRING	Motor cable:	Motor leads are fully terminated with robust Molex MiniFit connectors.
BEARINGS	Type:	Oversized, single row, deep groove, radial.
	Tolerance (in):	0.0000015.
ELECTRICAL SPECS	Winding type:	Class H.
	Winding rating:	155°C.
	R:	1.2 ohms.
	I:	1.8 mH.
	Ke:	14.7 Vpeak/kRPM.
MECHANICAL LOADING	Electrical TC:	1.5 mS.
	Shaft side load:	70.01 lbs centered 1" from bearing face (for infinite shaft life with 99% reliability factor).
	Bearing life vs. load: (at 95% L5 life)	0 lbs radial = 62,000,000,000 revs.
		5 lbs radial = 53,500,000,000 revs.
		10 lbs radial = 47,000,000,000 revs.
		20 lbs radial = 38,500,000,000 revs. 40 lbs radial = 26,000,000,000 revs.
COUNTRY OF ORIGIN	Manufactured in:	USA.

1: Typical, varies by application – contact your sales engineer for application specific rating.

